

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

Group Art Unit: 1733

KLAUS KOHLHAMMER ET AL.

Examiner: J. Gallagher

Continuation of U.S. Serial No. 09/495,533

Filed: January 31, 2000

For: PROCESS FOR LAMINATING TEXTILE SHEET  
MATERIALS ONTO MOLDABLE PARTICLE FOAM OR  
ONTO FOAMED MOLDINGS

Attorney Docket No.: WAS 0514 PUS

**PRELIMINARY AMENDMENT**

Commissioner for Patents  
United States Patent and Trademark Office  
Washington, D.C. 20231

Sir:

Prior to calculation of the filing fee and prior to examination on the merits,  
kindly amend the application as follows:

**In The Claims**

Kindly cancel claims 1-15 and add new claims 16-37.

16. (New) A process for laminating a textile sheet material to a foamed  
particle molding prepared by molding foamable polymer beads to form a laminated textile and  
foamed particle molding, said process comprising at least one of a) - c):

**CERTIFICATION UNDER 37 C.F.R. § 1.10**

I hereby certify that this CONTINUATION PATENT APPLICATION TRANSMITTAL and the documents referred to  
as attached therein are being deposited on the below date with the United States Postal Service in an envelope  
as "Express Mail Post Office to Addressee" addressed to: Box Patent Application, Commissioner for Patents,  
United States Patent and Trademark Office, Washington, D.C. 20231 on:

Express

Mail Label No. EV 011679028 US

Date of Deposit: FEBRUARY 26, 2002

TERRY M. KRUEGER

(Type or print name of person mailing paper)

Terry Krueger

(Signature of person mailing paper)

- a)i) applying a pulverulent solid adhesive to a textile sheet material to provide an adhesive-containing textile sheet material, and
- a)ii) contacting said adhesive-containing textile sheet material with a previously molded foamed particle molding, and
- a)iii) heating to fuse and optionally crosslink said solid adhesive;
- b)i) applying a pulverulent solid adhesive to a textile sheet material to form an adhesive-containing textile sheet material,
- b)ii) introducing said adhesive-containing textile sheet material into a mold,
- b)iii) introducing foamable polymer beads into said mold adjacent said adhesive-containing textile sheet, and
- b)iv) applying heat to foam said foamable polymer beads and to fuse and optionally crosslink said solid adhesive; and
- c)i) applying a pulverulent solid adhesive between a previously molded foamed particle molding and a textile sheet material, and
- c)ii) heating to fuse and optionally crosslink said solid adhesive,

whereby said textile sheet material is adhesively bonded to said foamed particle molding, wherein said pulverulent solid adhesive comprises a copolymer of 0.01 to 25 weight percent of one or more ethylenically unsaturated monomers bearing at least one carboxyl group, and at least one monomer from the group of vinyl esters, acrylates, methacrylates, vinyl aromatics, and vinyl chloride, and wherein said pulverulent solid adhesive has a  $T_g$  of about 30°C or higher.

17. (New) The process of claim 16 wherein said process comprises steps b)i to b)iv).

18. (New) The process of claim 16, wherein said process comprises steps a)i) to a)iii).

19. (New) The process of claim 16, further comprising applying said pulverulent solid adhesive to a textile sheet material and sintering said pulverulent solid adhesive particles to said textile sheet material prior to steps a)ii) and/or b)ii).

20. (New) The process of claim 19 wherein said sintering takes place at a temperature of from 150°C to 180°C.

21. (New) The process of claim 16, wherein said pulverulent solid adhesive comprises a polyvinyl acetate copolymer.

22. (Amended) The process of claim 16, wherein said pulverulent solid adhesive comprises a copolymer comprising moieties derived from styrene and acrylate(s) or methacrylate(s) of C<sub>1-15</sub> alcohol(s).

23. (Amended) The process of claim 17, wherein said pulverulent solid adhesive comprises a copolymer comprising moieties derived from styrene and acrylate(s) or methacrylate(s) of C<sub>1-15</sub> alcohol(s).

24. (New) The process of claim 19, wherein said pulverulent solid adhesive comprises a polyvinylacetate copolymer.

25. (New) The process of claim 16, wherein said pulverulent solid adhesive further comprises a pulverulent solid crosslinker containing two or more epoxy or isocyanate groups, said pulverulent solid crosslinker being present in an amount of 0.1 to 25 % by weight based on the weight of the pulverulent solid adhesive.

26. (New) The process of claim 16, wherein said pulverulent solid adhesive comprises a copolymer selected from the group consisting of copolymers of vinyl acetate and other non-vinyl acetate vinyl esters; copolymers of vinyl chloride and vinyl acetate; copolymers of vinyl acetate and at least one of acrylates and methacrylates; and copolymers of styrene and acrylates; each of the copolymers containing 0.01 to 25 weight percent moieties derived from ethylenically unsaturated mono- or dicarboxylic acids.

27. (New) The process of claim 16, wherein said adhesive has a  $T_g$  above 55°C.

28. (New) The process of claim 16, wherein said foamed particle molding is prepared by foaming expandable polystyrene, expandable polyphenylene oxide, expandable polyethylene, or expandable polypropylene.

29. (New) A process for laminating a textile sheet material to a foamed particle molding prepared by molding foamable polymer beads to form a laminated textile and foamed particle molding, said process comprising at least one of a) - c):

- a)i) applying a pulverulent solid adhesive to a textile sheet material to provide an adhesive-containing textile sheet material, and
- a)ii) contacting said adhesive-containing textile sheet material with a previously molded foamed particle molding, and
- a)iii) heating to fuse and optionally crosslink said solid adhesive;
- b)i) applying a pulverulent solid adhesive to a textile sheet material to form an adhesive-containing textile sheet material,
- b)ii) introducing said adhesive-containing textile sheet material into a mold,
- b)iii) introducing foamable polymer beads into said mold adjacent said adhesive-containing textile sheet, and
- b)iv) applying heat to foam said foamable polymer beads and to fuse and optionally crosslink said solid adhesive; and
- c)i) applying a pulverulent solid adhesive between a previously molded foamed particle molding and a textile sheet material, and

c)ii) heating to fuse and optionally crosslink said solid adhesive,

whereby said textile sheet material is adhesively bonded to said foamed particle molding, wherein said pulverulent solid adhesive comprises a copolymer of 0.01 to 25 weight percent of one or more ethylenically unsaturated monomers bearing at least one carboxyl group, and at least one monomer selected from the group consisting of vinyl esters, acrylates, methacrylates, vinyl aromatics, and vinyl chloride, wherein said pulverulent solid adhesive has a  $T_g$  of about 30°C or higher, and wherein said laminated textile and foamed particle molding is resistant to delamination at temperatures above 80°C.

30. (New) The process of claim 29, wherein said pulverulent solid adhesive is a styrene and butylacrylate copolymer.

31. (New) The process of claim 29, wherein said pulverulent solid adhesive is a vinyl acetate and vinyl chloride copolymer.

32. (New) The process of claim 29, wherein said solid pulverulent adhesive is a methyl methacrylate and butyl acrylate copolymer.

33. (New) A laminated molded particle foam and textile sheet material composite article, produced by the process of claim 17.

34. (New) A laminated molded particle foam and textile sheet material composite article, produced by the process of claim 18.

35. (New) A laminated molded particle foam and textile sheet material composite article, produced by the process of claim 19.

36. (New) In an aircraft, motor vehicle, watercraft or household article wherein an expanded particle foam and textile sheet material laminate is incorporated in the structure of said aircraft, motor vehicle, watercraft, or household article, the improvement

comprising selecting as at least one expanded particle foam and textile sheet material laminate, a laminate produced by the process of claim 16, and incorporating said laminate into said structure.

37. (New) In an aircraft, motor vehicle, watercraft or household article wherein an expanded particle foam and textile sheet material laminate is incorporated in the structure of said aircraft, motor vehicle, watercraft, or household article, the improvement comprising selecting as at least one expanded particle foam and textile sheet material laminate, a laminate produced by the process of claim 17, and incorporating said laminate into said structure.

## Remarks

Claims 16-37 are pending. Favorable early consideration is respectfully requested.

The claims have been amended to place them in U.S. format and to eliminate multiple dependencies. The claims are in some ways similar to those presented by amendment (16-39) in the parent case. Certain of these claims were indicated as allowable, and the present claims have been drafted to differentiate the present claims from those allowed claims.

The claims in the prior application had been made subject to a prior art rejection, and to a rejection under 35 USC §§ 101 and 112 as setting forth a "use." Applicants respectfully request that the Examiner reconsider these rejections as they may apply to the present claims.

Claims 36 and 37 have been rewritten from former claims 36 and 37, added by amendment in the parent case, to recite the additional positive step of "incorporating." However, in the experience of Applicants' attorney, "selecting," as opposed to "employing" has always been considered a positive process step, thus avoiding the characterization of the claims as "use" claims. With respect to 35 USC § 112, the focus here is on whether the scope of the claims is clear to one skilled in the art. Applicants submit that the former claims as well as the amended claims were clear in this regard. One skilled in the art would have no difficulty ascertaining the metes and boundaries of the claims.

The claims in the parent case were rejected under 35 USC § 103(a) over *Barns* GB 990,728 ("*Barns*") in view of *Morris* U.S. 2,732,324 ("*Morris*") further in view of either *Lazear* U.S. 4,185,050 ("*Lazear*") or *Christenson* U.S. 3,654,213 ("*Christenson*"). Claims were also rejected under 35 UC § 103(a) over *Cotterell* GB 1,329,094 ("*Cotterell*") in view of *Lazear* or *Christenson*. Please consider the following remarks regarding the new claims.

The subject limitation pertains to a process for preparing a laminated article wherein a textile sheet material is laminated to a particle foam molding by means of a select group of pulverulent solid adhesives. In the past, such laminates were prepared with solvent-borne adhesives which created great problems in handling during assembly. Use of solid granular adhesives of polyethylene avoided these handling problems but produced a laminate with inferior delamination strength. Moreover, the heat resistance at temperatures greater than 80°C was very low. Applicants solved these problems by the use of pulverulent solid adhesives based on addition polymers or copolymers of vinyl esters, acrylates, methacrylates, vinyl aromatics, and vinyl chloride which further contain 0.01 to 25 weight percent of carboxylic acid group-containing moieties. The use of these adhesives allows for the production of laminates on molded particle foam which are essentially permanent, i.e. very resistant to delamination, even at temperatures higher than 80°C, a temperature which may occasionally be reached in a closed vehicle in warm climes.

The age of the references alone is an indication of the non-obviousness of the invention. The principle references, *Barns*, *Morris*, and *Cotterell*, for example, date from the mid '60's to early '70's. *Christensen* was published in 1972, while *Lazear* was published in 1980. Yet, to Applicants' knowledge, no one had solved the problem of preparing textile laminates on foamed polymer particle moldings prior to the date of their invention.

With respect to *Barns* and *Morris*, Applicants question the propriety of their combination. The CAFC has recently spoken on the evidence required to support combination of references. In the case of *In re Anita Dembiczak and Benson Zinbarg*, 50 U.S.P.Q.2d 1614 (Fed. Cir. 1999), the CAFC has indicated that the requirement for showing the teaching or motivation to combine references is "rigorous." *Dembiczak* at 1617. Moreover, this showing, which is rigorously required, must be "clear and particular." *Dembiczak* at 1617. See also, *C.R. Bard v. M3 Sys., Inc.*, 48 U.S.P.Q.2d 1225, 1232 (Fed. Cir. 1998). It is well established that merely because references can be combined, the mere suitability for logical combination does not provide motivation for the combination. See, *Berghauser v. Dann, Comr. Pats.*, 204 U.S.P.Q. 398 (DCDC 1979);



*ACS Hospital Systems, Inc. v. Montefiore Hospital*, 221 U.S.P.Q. 929 (Fed. Cir. 1984). Moreover, mere conclusory statements supporting the proposed combination, standing alone are not "evidence". *McElmurry v. Arkansas Power & Light Co.*, 27 U.S.P.Q.2d 1129, 1131 (Fed. Cir. 1993). See also *Ecolochem, Inc. v. Southern Cal. Edison Co.*, 56 USPQ2d 1065 (Fed. Cir. 2000); and in particular, *In re Lee*, 61 USPQ2d 1430 (Fed. Cir. 2002).

*Morris* does not teach or suggest use of pulverulent solid adhesives. Rather, *Morris* discloses application of a liquid adhesive, for example a PVC emulsion. Moreover, *Morris* does not disclose application to a foamed polymer particle molding. The latter, as is known to those skilled in the art, involves the introduction of gas-containing solid polymer beads into a mold and heating the mold, generally with steam, to expand the particles and fuse them together to form a foamed molding. Examples of such foam products are expanded polyethylene foam, expanded polypropylene foam, and probably most well known, expanded polystyrene foam, i.e. Styrofoam® (Dow) and Styropor® (BASF).

*Morris* does not teach or suggest forming a laminate on such a product. Rather, *Morris* forms a porous (polymer particle foams are essentially non-porous) sheet material by sintering together polymer granules without completely melting the granules to form a sheet which retains porosity, and thus can be used in footwear applications. *Morris* uses liquid adhesives to form laminates from these porous products.

*Barns* discloses laminating a fabric to a polymer film by use of particles of polyethylene which fuse together under heat and pressure to bond the sheets together. Applicants find no motivation to combine *Morris* and *Barns*, as they are directed to diametrically different processes; *Morris* employs a liquid adhesive while *Barns* employs a solid adhesive. Neither reference discloses use of particle foam moldings.

Both *Lazear* and *Christenson* are directed to pressure sensitive adhesives (PSA). The PSA of *Christenson* is a solvent-borne PSA, while the PSA of *Lazear* is an "r-PSA" since it is removable by peeling.<sup>1</sup> Both references are directed to PSA and not to other types of adhesives. It is well recognized by those skilled in the art that the polymers of *Lazear* and *Christenson* have  $T_g$  of  $0^\circ\text{C}$  or less, otherwise they would not have the tack ("stickiness") to be a PSA. See, e.g. U.S. 5,049,416 which discloses that PSA have  $T_g$  of  $0^\circ\text{C}$  or below, and Product Definition Sheets from Rohm & Haas and Hankuck which disclose PSA having  $T_g$ s of  $-48$  (Rohm & Haas) and  $-50^\circ\text{C}$  and  $-56^\circ\text{C}$  (Hankuck). All the latter are attached hereto.

Polymers 1 to 3 of *Lazear* contain 79.5% butyl acrylate, 17.5% vinyl acetate, and 3% acrylic acid. Using the art-recognized Fox equation, the  $T_g$  can be calculated:

$$\begin{aligned} 1/T_g &= w_{BA}/T_{gBA} + w_{VA}/T_{gVA} + w_{AA}/T_{gAA} = 0.795/218 + 0.175/302 + 0.03/379 = \\ &0.00365 + 0.00058 + 0.00008 = 0.00431 = > T_g = 1/0.00431 = 232\text{K} = > T_g = -41^\circ\text{C} \end{aligned}$$

The *Christenson* PSA also have very low  $T_g$ . According to the Fox equation, the interpolymers described have the following  $T_g$ s.

Ex. 1	Ex. 2	Ex. 3	Ex. 4	Ex. 5	Ex. 6	Ex. 7
$-19^\circ\text{C}$	$-13^\circ\text{C}$	$-4^\circ\text{C}$	$-29^\circ\text{C}$	$-12^\circ\text{C}$	$-13^\circ\text{C}$	$0^\circ\text{C}$

All these  $T_g$ s are consistent with what one skilled in the art would expect for tacky PSA.

The Office has stated that these adhesives can be applied in solid form. However, this is incorrect. Both references apply their adhesives in liquid form, and for good reason. Upon drying, they form a very tacky solid or viscous syrup which is incapable of being converted into pulverulent (powder) form. One skilled in the art,

---

<sup>1</sup> One would not be motivated to use such r-PSA to form a laminate as per the subject invention since the fabric of the laminate could be simply peeled away.

desirous to employ a solid pulverulent adhesive, would not look to *Lazear* or *Christenson*. Rather, of the references cited, the skilled artisan would look to *Barns*, the only reference which employs a solid particulate adhesive. However, the polyethylene adhesive of *Barns* is known to be deficient, as shown by the Comparative Example in the subject application. The claims have been amended to recite a  $T_g$  above about  $30^\circ\text{C}$ ,<sup>2</sup> to ensure that it is known that the pulverulent adhesives are not low  $T_g$  PSA adhesives as disclosed by *Lazear* and *Christenson*.

*Cotterell* has also been examined. *Cotterell* is the only reference directed to use of polymer particle moldings. However, *Cotterell*, like *Lazear* and *Christenson*, teaches only the use of adhesives dissolved in solvent. These are applied to a structural insert to be contained within the polymer foam molding and the solvent allowed to evaporate, forming a non-tacky adhesive. Thus, the adhesives of *Cotterell* are not PSA. Rather, they are like rubber-based contact cements sold under the tradename "Pliobond"<sup>®</sup> which require, in the absence of heat, both surfaces to be bonded to be coated, dried, and then pressed together. Prior to contact, the dried adhesive is relatively tack-free. By contrast, the adhesives of *Lazear* and *Christenson*, when the solvent is evaporated, generate viscous liquid films or very tacky solid films. The use of tacky films is what *Cotterell* attempts to avoid. See, column 1, line 44 to column 2, line 61. Thus, one skilled in the art would not be motivated to combine *Cotterell* with either *Lazear* or *Christenson*. *Dembiczak, supra*. Even if combined, however, the combination does not teach or suggest the subject invention, since neither of these references disclose any pulverulent solid adhesive, much less one with a  $T_g$  of  $30^\circ\text{C}$  or above.

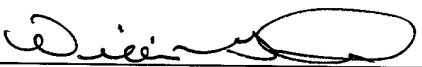
---

<sup>2</sup> Even prior to amendment, the claims did not read on the adhesives of *Lazear* or *Christenson*, as these are not pulverulent solid adhesives, nor could they be converted to such.

For the reasons expressed above, Applicants submit that the claims are patentable, and respectfully request a Notice of Allowance attesting thereto.

Respectfully submitted,

**KLAUS KOHLHAMMER ET AL.**

By 

William G. Conger

Reg. No. 31,209

Attorney/Agent for Applicant

Date: February 26, 2002

**BROOKS & KUSHMAN P.C.**

1000 Town Center, 22nd Floor

Southfield, MI 48075

Phone: 248-358-4400

Fax: 248-358-3351